

What is claimed is:

1. A method of treating a solid substrate, the method comprising:

(I) providing a solid substrate;

(II) contacting the solid substrate with an aqueous solution of at least one

5 compound having a dianion, and thereafter,

(III) contacting the solid substrate from (II) with a silicon-containing material
capable of reacting at or near the solid substrate surface.

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2. A method as claimed in claim 1 wherein there is in addition, a catalyst present for the reaction of (III).
3. A method of treating a solid substrate, the method comprising:
- (I) providing an aqueous solution of:
- 5 (i) at least one compound having a dianion and
(ii) a silicon-containing material capable of reacting at or near the surface of the solid substrate;
- contacting the solid substrate with the an aqueous solution from (I).
4. A method as claimed in claim 3 wherein there is in addition, a catalyst present for the reaction potential in (ii).
- 10 5. A method of treating a solid substrate, the method comprising:
- (A) providing an aqueous solution of a silicon-containing material;
(B) contacting the solid substrate with the aqueous solution from (A), and thereafter,
- 15 (C) contacting the solid substrate (B) with an aqueous solution of at least one compound having a dianion.
6. A method as claimed in claim 5 wherein there is in addition, a catalyst present in (C).
7. A method of treating a treated solid substrate, the method comprising:
- (I) providing a chemically treated solid substrate,
20 (II) contacting the chemically treated solid substrate with an aqueous solution of at least one compound having a dianion, and thereafter,
(III) treating the solid substrate from (II) with a silicon-containing material capable of reacting with the at least the chemical used to chemically treat the solid substrate.
- 25 8. A method as claimed in claim 7 wherein in addition, there is a catalyst present for the potential reaction in (III).
9. A method of treating a treated solid substrate, the method comprising:
- (I) providing a chemically treated solid substrate,
30 (II) treating the solid substrate with a silicon-containing material capable of reacting with the at least the chemical used to chemically treat the solid substrate and thereafter,

- (III) contacting the treated solid substrate with an aqueous solution of at least one compound having a dianion.
10. A method as claimed in claim 9 wherein in addition, there is a catalyst present for the potential reaction in (III).
- 5 11. A method of treating a solid substrate, the method comprising:
- (I) providing an aqueous solution of:
- (i) at least one compound having a dianion and
- (ii) a silicon-containing material capable of reacting at or near the surface of the solid substrate;
- 10 (II) contacting the solid substrate with the aqueous solution from (I).
12. A method as claimed in claim 11 wherein in addition, there is a catalyst present for the potential reaction in (ii)
13. The method as claimed in claim 1 wherein the dianion is selected from the group consisting essentially of:
- 15 a. SO_4^- , f. MnO_3^- ,
 b. CO_3^- , g. MnO_4^- ,
 c. HPO_4^- , h. WO_4^- , and
 d. Cr_2O_7^- , i. $\text{C}_2\text{O}_4^{--}$.
 e. CrO_4^- , j. mixtures of a.-i.
- 20 14. The method as claimed in claim 1 wherein the silicon-containing material is a silane.
15. The method as claimed in claim 14 wherein the silane is an organofunctional silane.
16. The method as claimed in claim 1 wherein the silicon-containing material is an alkoxy functional silane.
17. The method as claimed in claim 15 wherein the silane is an aminoorganofunctional silane.
- 25 18. The method as claimed in claim 17 wherein the aminoorganofunctional silane has the general formula:
- $$(\text{RO})_n\text{Si}\{(\text{C}_x\text{H}_{2x})\text{N}^+(\text{R}^2)_b(\text{R}^3)_{3-b}\text{X}^-\}_{4-n}$$
- wherein n has a value of 1, 2, or 3; x has a value of 1 to 20; R is an alkyl group having 1 to 6 carbon atoms; each R^2 is an alkyl group selected from the group consisting of 1 to 6

carbon atoms, X is a halogen, each R³ is an alkyl group selected from the group consisting of 1 to twenty carbon atoms and b has a value of 0, 1, 2, or 3.

19. The method as claimed in claim 18 wherein R is a methyl radical, _n has a value of 3, _x has a value of 3, each R² is a methyl group.

5 20. The method as claimed in claim 1 wherein the solid substrate is selected from the group consisting essentially of:

- a. cotton,
- b. polyester,
- c. nylon,
- d. rayon,
- e. rubber,
- f. fibers,
- g. acrylic,
- h. foams,
- i. polypropylene,
- j. polyethylene,
- k. mineral,
- l. polyurethane,
- m. paper,
- n. glass,
- o. silica,
- p. wood,
- q. concrete,
- r. other solid polymers,
- s. other hard surfaces, and
- t. building products.

21. The method as claimed in claim 16 wherein the alkoxy silane is methyltrimethoxysilane.

15 22. The method as claimed in claim 16 wherein the alkoxy silane is trimethoxysilane.

23. The method as claimed in claim 1 wherein the silicon-containing material is an oligomer siloxane.

24. The method as claimed in claim 1 wherein the silicon-containing material is a polymeric siloxane.

20 25. The method as claimed in claim 1 wherein the silicon-containing material is a disilane.

26. The method as claimed in claim 1 wherein the silicon-containing material contains an —Si(C)_ySi—linkage.

27. The method as claimed in claim 26 wherein y has a value of from 1 to 12.

25 28. The method as claimed in claim 1 wherein the silicon-containing material is a silicone/organic copolymer.

29. A solid substrate when treated by the method of claim 1.